

A dynamic Atmospheric Correction Scheme for NPOESS, VIIRS

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We present the atmospheric correction algorithm developed for the Land Module environmental data records and intermediate products from the Visible/Infrared Imagery/Radiometer Suite (VIIRS) that will be on-board the National Polar-orbiting Environmental Satellite System (NPOESS) and its predecessor, the NPOESS Preparatory Project (NPP; launch 2006). This algorithm has been derived from Moderate Resolution Imaging Spectroradiometer and Thematic Mapper lessons learned. It includes near real-time total column water vapor, ozone, and aerosol optical thickness data input fields to account for the coincident natural variability in these input variables. The atmospheric correction algorithm variables may be separated into non-varying and varying components in space and time in order to minimize operational processing time. For example, non-varying variables only need to be corrected for once and include, viewing and illumination geometry; target elevation; Rayleigh scattering, assuming negligible surface pressure tendencies and absorption due to permanent atmospheric gases (e.g. oxygen); and ozone. In contrast, the varying variables include water vapor and aerosol optical thickness. The varying variables are modeled assuming they are radiatively decoupled, and the validity of this assumption is mentioned. The resulting atmospherically corrected surface reflectance values are functions of solar zenith angle, satellite (viewer) zenith angle, satellite azimuth angle relative to the solar azimuth angle, and the height of the observed surface above sea level. They are subsequently corrected for adjacency and bi-directional reflectance distribution function (BRDF) affects. The BRDF correction is presently an approximation due to operational constraints, and developmental maturity. Details will be presented at the meeting.